MEANS FOR SPLASH SEPARATION ON PAPER MACHINES

Field of the invention

The present invention pertains to paper making machines and relates more particularly to a means for collecting and conveying away water splash from the dandy roll in a fourudrinier machine.

Prior art

Dandy roll means are used in fourudrinier machines for manufacturing of paper. The dandy roll normally rests with its weight on the paper wire cloth prior to the drying section and is an open, wire cloth covered cylinder. Its function is to disintegrate fiber flocks and it is sometimes called laid dandy roll. In the nip between the paper wire cloth and the dandy roll water penetrates through the apertures in the wire cloth of the dandy roll while the stock layer is deflocculated. The water, which thereupon is slung from the circumference of the dandy roll by means of the centrifugal force, is collected in so-called splash separators and is conveyed away from the paper wire cloth.

In existing splash separation means one or more doctor blades are used, which are positioned closely to the dandy roll, so that an underpressure is generated, which facilitates for the water to leave the dandy roll. There is always a certain amount of fiber material and other solid matter which follows with the water, whereby said material tends to get stuck in the edge of a tub underlying the splash separator. The tub is located directly under the dandy roll in order to capture the water splash and it is difficult to reach the tub. The splash separator has to be cleaned permanently in order to remove the accumulated solid matter. Due to the location of the tub production has

to be stopped temporarily when cleaning the tub, which involves an economic loss.

Summary of the invention

The object of the invention is to collect and convey water splash from the dandy roll with a simple design, whereby the need for cleaning the splash separator is eliminated or at least substantially reduced. At the same time cleaning of the tub is facilitated.

This object is achieved by installation of a rotating roll, which is positioned under the water splash. The water splash is captured by the roll and is wiped off the roll by means of a doctor blade, which is positioned close to the roll. The water, which is wiped off, is conveyed down into a tub and subsequently out of the machine.

The invention is based on the understanding that it is possible to position the tub, which receives the splash water into a more easily accessible position by positioning a roll under the dandy roll. The tub at the roll replaces the tub positioned under the dandy roll according to the prior art. Thus, by using the roll, the tub gets more easily accessible and in that way it gets easier to clean.

Brief description of the figures

The invention will be explained more in detail below with reference to the appended drawings. In these

Fig. 1 shows a side view of dandy roll means according to the invention and

Fig. 2 shows a top view of the means according to Fig. 1, partly in a cutaway cutting section for elucidating purposes.

Detailed description of preferred embodiments

The dandy roll 1 rests with its weight on the paper wire 2 immediately before the drying section. A rotating

roll 3 is arranged close to the dandy roll 1 in order to capture water splash from the dandy roll 1. The roll 3 is arranged parallell to the dandy roll 1 and has normally the same length as the dandy roll 1. The roll 3 is positioned in such a position that it completely lies under a imaginary horizontal plane, which goes through the center of the dandy roll 1. The roll 3 is furthermore positioned in such a way that a gap is formed between the roll 3 and the dandy roll 1. The roll 3 is by means of a fastening means 7 attached to two sliding ferrules 6, which in turn are positioned on slide bars 5. The position of the roll 3 is vertically adjustable by means of fastening means 7 and its position is horizontally adjustable by moving the sliding ferrules 6 along the slide bars 5. The fastening means 7, the sliding ferrules 6 and the slide bars 5 facilitate maintenance and replacement of the roll 3. In other embodiments other types of fastening means are used. The roll 3 is rotated in a conventional way by means of a motor 13, which is indicated in Fig. 2.

A doctor blade 9 is positioned at the dandy roll 1, on a level above the center line of the dandy roll 1 for scraping away fluid from the dandy roll 1. The doctor blade 9 is attached to a support which is fastened to the dandy roll means. The direction of the doctor blade 9 and the distance to the envelope surface of the dandy roll 1 are adjustable for a maximum effect. The water can flow from both the underside and the upper side of the doctor blade 9. The doctor blade 9 extends over the whole length of the dandy roll 1 and is positioned under a cover 11 when this is fold down. It is even possible to have a plurality of doctor blades 9 positioned at different heights.

A cover 11 is positioned above the roll 3 and acts as a shielding device for collecting and conveying down splashwater from the dandy roll 1 to the roll 3. The cover 11 consists of a wall at each end of the dandy roll 1 and a

wall in parallell with the dandy roll 1, whereby said wall is joined with the other two walls at the ends of the dandy roll 1. The wall of the cover 11 in parallell with the dandy roll 1 is positioned aligned with or substantially aligned with the outer circumference of the roll 3 at the circumferencial part which is turned away from the dandy roll 1. The cover 11 is in the illustrated embodiment journalled upwardly tiltable with respect to the dandy roll 1. In other embodiments the cover 11 is fixed and can not be tilted upwards. The cover 11 is shaped and positioned in such a way that any water splash, which flows off the walls of the cover 11 lands on the roll 3 and is diverted away.

A shield 8 shields the dandy roll 1 from the paperweb 2 but functions at the same time as a part of the splash separator. A doctor blade 4 leads water splash from the roll 3 down into a tub 10. The doctor blade 4 extends along the whole length of the roll 3. Even if only one doctor blade 4 is shown, which is the normal case, other embodiments (not shown) can use a plurality of doctor blades 4 positioned at different heights. The doctor blade 4 must abut against the roll 3, so that the water only can flow off the upper side of the doctor blade 4. As little water as possible, and preferably no water at all, should follow with the roll 3 behind the doctor blade 4.

From the tub 10 the water is drained off the machine. The size of tub 10 is adapted to the size of the roll 3 as well as to the size of the shield 8. The tub 10 can be shaped with rectangular or circular cross section. The water can either be drained from one short side 14 of the tub 10 or from both short sides 14 of the tub 10. Usually this is done by the one or both short ends 14 being open. In this connection the tub 10 is positioned or shaped inclined towards one or both ends 14 of the tub 10, depending where the openings of tub 10 are situated. The tub 10 is also provided with two tubes 12 on the inside,

whereby said tubes 12 are steam coils of an existing steam system. The steam is used to heat up the tub 10 and, thus, formation of condense is avoided on the walls of the tub 10.

The roll 3 is either provided as a solid or a hollow roll, whose circumferential surface preferably is manufactured of a hard rubber material. Plastic or ceramic materials are generally also suitable. The roll 3 can alternatively be covered or coated with a material, which is suitable for capturing water splash. Thus, the material of the roll surface can be any material, which gives a smooth but not water repelling surface, which is also valid for covering material or coating material. An important criterium for the surface of the roll 3 is that it is smooth because all water will be scraped away from the roll 3 to the tub 10 in order to be conveyed further.

The diameter of the roll 3 is adapted to the outer diameter of the dandy roll 1. The diameter determines also how large the resulting circumferential surface is for capturing the water splash. The size of the circumferential surface is to be adapted in a way that all splash, which is scraped away from the dandy roll wire 1, lands on the roll 3. The diameter and speed of roll 3 influence the function in such a way that a larger diameter at a certain rotational speed results in a higher periferical speed. If the speed is too high the water is slung from the roll 3 while a too low speed does not have the desired effect. The diameter of the roll 3 is also determined by the space around the dandy roll 1.

The periferical speed of the roll 3 can vary between 10-400 m/min, but usually lies in the range of 50-250 m/min. The periferical speed of the dandy roll 1 varies from machine to machine and has a speed, which is about 0,5-1,5 % higher than that of the paperweb. The speed is normally from approximately 400 m/min up to approximately

1000 m/min. The diameter of the dandy roll 1 usually varies between approximately 1000 mm to approximately 2500 mm. The higher the speed, the more water has to be scraped away.

In operation, the splash water from the dandy roll 1 is scraped away by means of the upper doctor blade 9. The splash water leaves the dandy roll 1 also by means of the centrifugal force caused by the rotation of the dandy roll 1. Thanks to the cover 11 and the force of gravity the splash water will fall down on the roll 3. The water, which has been caught by the roll 3, is scraped away from the roll 3 by means of the doctor blade 4 and is collected in the tub 10 under the doctor blade 4. Finally, the water leaves the tub 10 at one or both short sides 14, depending on whether only one or both short sides 14 are open.